

WHITEWATER RIVER & WEST FORK WHITEWATER RIVER
DEARBORN, FAYETTE, FRANKLIN, AND WAYNE COUNTIES

2005 Fish Management Report

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EXECUTIVE SUMMARY

- The West Fork Whitewater River stretches approximately 59 mi from its origin in southern Randolph County to its confluence with the East Fork below Brookville, Indiana in Franklin County. The Whitewater River is located in southeastern Indiana and flows southeast into Ohio. Eight mi downstream of the Indiana/Ohio border, the Whitewater River joins the Great Miami River.
- A fisheries survey was conducted between September 19 and 30, 2005 at 12 sites to describe the fish community and assess the habitat at each sampling location.
- A total of 4,969 fish was collected that weighed 1,188.5 lbs. The sample consisted of 13 families of fish represented by 56 species and three hybrids. Northern hogsucker was the most abundant species collected by number (13%), followed by central stoneroller (12%), gizzard shad (8%), golden redhorse (8%), and emerald shiner (7%). The five most abundant species by weight were golden redhorse (26%), black redhorse (12%), common carp (10%), gizzard shad (9%), and northern hogsucker (8%).
- Gamefish (smallmouth bass, rock bass, largemouth bass, spotted bass, white bass, channel catfish, sauger, hybrid striped bass, and saugeye) comprised only 5% of the sample by number.
- A total of 131 smallmouth bass that weighed 46.1 lbs was collected. Smallmouth bass was collected at every station and accounted for 50% of the gamefish collected. Smallmouth ranged in length from 1.5 to 20.5 in and 11% met or exceeded the 12-in minimum size limit.
- Forty-seven rock bass were collected and made up 14% of the sunfish species collected. Rock bass ranged in length from 1.8 to 8.5 in. Even though rock bass were collected at every station during the survey, just over half were found at RM 52.7, 56.0, and 60.5.
- Overall, habitat quality at the stations surveyed was good. QHEI scores ranged from 62.25 at RM 46.7 to 83.7 at RM 74.2 and averaged 73.8. Habitat scores greater than 60 generally indicate that few stream alterations have been made and scores above 70 reflect very good habitat.
- Species diversity in the West Fork Whitewater River and Whitewater River is above average compared to other major streams in Indiana. The average number of species collected per survey of Indiana's major streams in the early to mid 1990's was 35.3 and the average number of species per site was 20.4 (Shipman 1997). Overall, 58 species were collected and the average number of species collected per site was 24.8.
- Access to the West Fork Whitewater River and Whitewater River is limited to canoe liveries, private property, and bridge crossings. The Division of Fish and Wildlife should consider purchasing and developing public access if suitable property becomes available.

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INTRODUCTION

The Whitewater River is located in southeastern Indiana and flows southeast into Ohio (Figure 1). Eight mi downstream of the Indiana/Ohio border, the Whitewater River joins the Great Miami River. The drainage area of the river at the state line is approximately 1,369 square mi (Hoggatt 1975). Twenty-one mi upstream from the state line, the Whitewater River splits into the East and West Forks of the Whitewater River. In 1974, the East Fork Whitewater River was impounded approximately 2.0 mi upstream of its confluence with the West Fork to form Brookville Reservoir, a 5,260-acre flood control reservoir.

The West Fork Whitewater River stretches approximately 59 mi from its origin in southern Randolph County to its confluence with the East Fork below Brookville, Indiana in Franklin County. The drainage area of the West Fork and its tributaries is roughly 842 square mi (Hoggatt 1975). The drainage basin extends approximately 40 mi north and is about 20 mi in width, encompassing at least seven counties (Walterhouse 1993). Agriculture is the primary land use within the watershed with lesser amounts of residential, commercial, industrial and forested areas. Major municipalities on the West Fork include Brookville in Franklin County, and Connersville in Fayette County. Smaller towns on the river and tributaries include Metamora and Laurel in Franklin County, and Milton, Centerville, Hagerstown, and Fountain City in Wayne County (Kingsley and Kiley 1989).

Recreational boaters regularly visit the Whitewater River and West Fork Whitewater River. Numerous canoe liveries operate in the vicinity of Brookville. No state-owned public access sites are located on either river. The river can be accessed from canoe liveries or from private property with permission. Navigation of the river can be difficult due to the abundance of shallow, rocky riffles. Canoes, small jon boats, or river boats equipped with jet-propelled motors are best suited for traversing the river.

Previous surveys of the Whitewater River and West Fork Whitewater River include Gerking (1940-1943), Huffaker (1971), Kingsley and Kiley (1983 and 1986), and Walterhouse (1992). The objectives of the present survey were to describe the fish community (gamefish and non-gamefish) and assess the habitat at each sampling location.

METHODS

Fish Sampling

Three stations on the Whitewater River and nine stations on the West Fork Whitewater River were sampled between September 19 and 30, 2005. Sampling stations are identified by river mile (RM) in Figure 1. River mile is defined as the number of mi a station is from the confluence of the Whitewater River with the Great Miami River in Ohio. The RM of each station was calculated using United States Geological Survey (USGS) topographic maps and Hoggatt (1975). Stations were selected based on historical records, accessibility, and location. An effort was made to keep stations approximately five to 10 mi apart depending on sampling effort. Stations at RM 8.5, 17.4, and 29.2 were also sampled during the 1992 Whitewater River survey. Stations at RM 46.7, 56.0, 60.5, and 74.2 were sampled during the 1983/1986 West Fork Whitewater River survey.

Stations at RM 8.5, 17.4, 29.2, and 39.2 were sampled using a pulsed DC electrofishing boat during the day with two dippers. Boat sampling was conducted in a downstream direction and effort ranged from 0.59 to 0.84 h. Eight stations were sampled using a Smith-Root DC barge electrofisher during the day with a crew of at least three people. Barge sampling was conducted in an upstream direction and effort ranged from 0.50 to 0.53 h. The sampling effort for all 12 stations totaled 7.07 h.

An attempt was made to collect all fish. Species that could not be identified in the field were preserved in 10% formalin and transported back to the office for positive identification. All gamefish were measured to the nearest 0.1 in and weighed to the nearest 0.01 lb. Scale samples were taken from gamefish for age and growth analysis. Non-gamefish were enumerated, bulk weighed, and a length range determined.

Seine hauls were conducted in shallow, fast-moving riffles at RM 29.2 and RM 39.2 in an attempt to collect fishes that may not have been collected while electrofishing. Hauls were conducted in a circular, upstream direction or by placing the net across a riffle and having other crewmembers disturb the substrate immediately upstream of the seine. Due to low diversity and few fish collected via seining, fish collected during the hauls were combined with fish collected via electrofishing.

Habitat Evaluation

The Qualitative Habitat Evaluation Index (QHEI), developed by the Ohio Environmental Protection Agency (1989) and Rankin (1989), is a physical habitat index used to score and describe the available habitat important to fish communities. A score from 0 to 100 is assigned to each station and allows for comparisons of habitat quality between stations and streams. Metrics of the QHEI score are substrate, instream cover, channel morphology, riparian zone and bank erosion, pool/riffle/run quality, and gradient.

Dissolved oxygen, conductivity, water temperature, and air temperature were recorded at each station. Physical descriptions for each station included water stage, percent of open canopy, turbidity, aesthetic rating, and average width and depth. All were calculated according to the DFW survey guidelines (Shipman 2001). Global positioning system (GPS) coordinates were recorded at the upper and lower boundaries of each station. These coordinates were later overlayed onto aerial photos and the station length was calculated to the nearest ft using geographic information systems (GIS) software.

RESULTS

Fish Sampling

A total of 4,969 fish was collected (Appendix A). The sample consisted of 13 families of fish represented by 56 species and three hybrids (Appendix B). The total number of species collected from each site ranged from 19 at RM 46.7 to 33 at RM 29.2. An average of 24.8 species was collected per site (Appendix C).

Northern hogsucker was the most abundant species collected by number (13%), followed by central stoneroller (12%), gizzard shad (8%), golden redhorse (8%), and emerald shiner (7%). The remaining species accounted for 5% or less of the sample by number. Gamefish (smallmouth bass, rock bass, largemouth bass, spotted bass, white bass, channel catfish, sauger, hybrid striped bass, and saugeye) comprised 5% of the sample by number.

The total weight of fish collected was 1,188.5 lbs. The five most abundant species by weight were golden redhorse (26%), black redhorse (12%), common carp (10%), gizzard shad (9%), and northern hogsucker (8%).

Carp and Minnow Family (Cyprinidae)

The minnow family was the most abundant family collected by number (39%) and second by weight (14%). Seventeen species and one hybrid comprised the collection of 1,943 minnows that weighed 159.9 lbs. Two of the five most abundant species collected during the survey by number were central stoneroller and emerald shiner. Together these species accounted for 48% of the minnows collected. Even though only 21 common carp were collected, they were the most abundant minnow collected by weight (118.4 lbs).

Sucker Family (Catostomidae)

Overall, 11 species of suckers were collected. The sucker family was second in abundance by number (33%) and first in abundance by weight (67%). Three of the six most abundant species collected during the survey by number were from the sucker family; northern hogsucker, golden redhorse, and black redhorse. Together these species accounted for 79% of the suckers collected. Additionally, golden redhorse was the most abundant species collected by weight (26%) over all twelve stations. The four species of redhorse collected and northern hogsucker are considered moderately intolerant of poor water quality and habitat degradation. Many of the sucker species collected require silt-free cobble or gravel riffles to spawn successfully.

Herring Family (Clupeidae)

Gizzard shad and skipjack herring were the only members of this family collected. Of the 419 individuals in the family collected, only 8 were skipjack herring. Approximately 84% of the gizzard shad were collected at or below RM 29.2 (mainstem Whitewater River) and 81% of those were collected at RM 8.5.

Perch Family (Percidae)

Ten species of the perch family were collected, most of which were darters (small non-game fish). Darters generally inhabit quality riffles with stable substrates that provide cover and abundant food resources. Rainbow darter accounted for 41% of the perch family collection by number. Only 2 species of game fish represented the perch family; sauger and saugeye. A total of five sauger were collected: four at RM 8.5 and one at RM 29.2. Additionally, one saugeye was collected that weighed 3.2 lbs and accounted for 43% of the perch family weight.

A single, state-endangered variegate darter was collected at RM 39.2 in a seine haul. This species of darter was not collected in either the 1983/1986 or 1992 surveys (Kingsley and Kiley 1989, Walterhouse 1993). “Historically variegate darters were known to inhabit the Whitewater drainage (mainstem, East and West forks), Blue River and the mainstem Ohio River. Now, the only verified collections are from the mainstem Whitewater and West Fork upstream to the dam that forms the Whitewater canal, just south of Laurel” (B. Fisher, personal communication, 2007).

Sunfish Family (Centrarchidae)

Seven species of the sunfish family were collected and represented 7% of the total sample by number. A total of 344 fish that weighed 66.3 lbs was collected.

A total of 131 smallmouth bass that weighed 46.1 lbs was collected. Smallmouth bass was collected at every station and was the most abundant gamefish collected. Smallmouth bass comprised 38% of the sunfish collected by number and 70% by weight. Smallmouth bass ranged in length from 1.5 to 20.5 in (Table 1). CPUE (catch per unit effort) was 29.3 and 10.4 smallmouth/h at boat and barge electrofishing stations, respectively. Eleven percent of smallmouth bass met or exceeded the 12-in minimum size limit for black bass (largemouth bass, spotted bass, and smallmouth bass) in streams. Good numbers of YOY (young-of-the-year) smallmouth bass were collected indicating good recruitment. Additionally, good numbers of smallmouth from age 1 through age 4 were also present. Smallmouth bass growth was average compared to other central Indiana streams (Appendix D).

The second most abundant sunfish species collected was longear sunfish, which accounted for 19% of the sunfish collected by number. Longear ranged in length from 1.9 to 6.3 in. Longear sunfish are common in Indiana streams that contain good water quality but seldom exceed 6 in TL.

Forty-seven rock bass were collected and made up 14% of the sunfish species collected. Rock bass ranged in length from 1.8 to 8.5 in. Even though rock bass were collected at every station during the survey, 26% were collected at RM 56.0 (Table 2). Rock bass growth was well below average (Appendix D).

Other members of the sunfish family that were collected included largemouth bass, bluegill, green sunfish and spotted bass. These species will contribute little to the sport fishery due to their low abundance and the relatively small size of those collected.

Sculpin Family (Cottidae)

Mottled sculpin comprised the entire sample of this family with 181 individuals collected. Mottled sculpin were not collected downstream of RM 52.7. Thirty-five percent of the sculpin were collected at RM 78.2.

Drum Family (Sciaenidae)

The freshwater drum is the only species of this family found in Indiana. Twenty-three drum ranging in length from 4.1 to 17.8 in were collected. All 23 fish were collected at the two lower sampling stations (RM 8.5 and RM 17.4).

Bullhead Catfish Family (Ictaluridae)

Representatives of this family by number included channel catfish (12), stonecat (6), and yellow bullhead (2). Over half of the channel catfish collected were at RM 8.5. Channel catfish ranged in length from 11.4 to 23.9 in with the largest fish weighing 5.5 lbs. Channel catfish accounted for over 2% of the weight of all fish collected during the survey. No channel catfish were collected above RM 39.2.

Temperate Bass Family (Moronidae)

Two members of this family, white bass and hybrid striped bass, were collected. A single hybrid striped bass was collected at RM 8.5 and measured 5.3 in. Fourteen white bass were collected at or below RM 29.2 and ranged in length from 5.1 to 13.0 in.

Lamprey Family (Petromyzontidae)

Four American brook lamprey were collected and ranged in length from 7.0 to 7.8 in. The lamprey collected just completed the larval stage (ammocoete) and had transformed into the adult form. The American brook lamprey is non-parasitic and one of seven species of lampreys found in Indiana. Northern brook lamprey and an unidentified larval lamprey were collected in the West Fork Whitewater River during the 1983/1986 survey. Two of the American brook lamprey were collected at RM 60.5 which corresponds to the location where the 1983/1986 collection of the Northern brook lamprey and at least one larval lamprey occurred.

Gar Family (Lepisosteidae)

A single longnose gar was collected at RM 17.4 that measured 35.2 in. Gar typically occupy slow-moving pools. Longnose gar was collected at every station during the 1992 survey of the Whitewater River.

Pike Family (Esocidae)

One grass pickerel that measured 6.8 in was collected at RM 74.2. Grass pickerel usually inhabit shallow, slow-moving water. Grass pickerel usually do not grow to a size desirable by anglers.

Mudminnow Family (Umbridae)

One central mudminnow that measured 3.2 inches was collected at RM 78.2.

Habitat Evaluation

Overall, habitat quality at the stations surveyed was good. QHEI scores ranged from 62.25 at RM 46.7 to 83.7 at RM 74.2 and the average score was 73.8 (Appendix C). The average QHEI score between stations located on the mainstem Whitewater River and West Fork Whitewater River differed by a little more than one point (74.8 and 73.5, respectively). The maximum possible QHEI score is 100. Habitat scores greater than 60 generally indicate that few stream alterations have been made and scores above 70 reflect very good habitat.

The substrate (bottom composition) varied across all stations. Over half of the stations contained more than four substrate types. Instream cover most often consisted of overhanging vegetation, shallow or deep water, boulders, and large woody debris and was sparse to moderate across all stations. Channel morphology, the width and composition of the riparian zone, bank erosion, pool/riffle/run quality, and stream gradient were all highly variable between stations.

Dissolved oxygen ranged from 5.4 to 13.0 parts per million, which is suitable for fish and other aquatic organisms. Conductivity ranged from 410 to 680 microsiemens. Overall, the water stage at all stations was “normal” except RM 56.0 where the water stage appeared to be “low”. Water clarity was good as most Secchi disk readings were on the bottom of the river.

Channel morphology, canopy cover, and gradient can all impact water temperature. Water temperature ranged from 54.5°F at RM 78.2 to 73.2°F at RM's 8.5 and 17.4 and averaged 66.0°F. The water temperature averaged 64.5°F on the West Fork Whitewater River (9 stations)

and 71.5°F on the mainstem Whitewater River (3 stations). The greatest influence to the temperature regime of the mainstem Whitewater River could occur immediately downstream of RM 29.2 where the tailwater from Brookville Reservoir enters the river. The effect of the tailwater on the mainstem water temperature would depend on the time of year, amount, and temperature of the water being released.

The average station length was 1,376 ft and ranged from 427 ft at RM 78.2 to 3,764 ft at RM 8.5. The average width of all stations was 133 ft and the average depth was 28 in. Individual station descriptions are located in Appendix C.

DISCUSSION

Species diversity in the West Fork Whitewater River and Whitewater River is above average compared to other major streams in Indiana. Overall, 56 species, hybrid striped bass, hybrid walleye and one hybrid minnow were collected and the average number of species collected per site was 24.8 during the September 2005 survey. The average number of species collected per survey of Indiana's major streams in the early to mid 1990's was 35.3 and the average number of species per site was 20.4 (Shipman 1997).

The relative abundance of all gamefish (5%) was negligible compared to the total catch of the entire survey. Smallmouth bass and rock bass were collected at all 12 stations and accounted for 50 and 18% of the gamefish collected, respectively. Largemouth and spotted bass should contribute little to the sport fishery due to their low abundance and the relatively small size of those collected. Anglers may consider targeting channel catfish and white bass. Catfish up to 23.9 in and white bass up to 13.0 in were collected from the mainstem Whitewater River.

In 1997 and 2002, the Indiana Department of Environmental Management (IDEM) conducted a habitat evaluation (QHEI) at 19 and 38 sites, respectively, within the Whitewater River watershed in Indiana. The average QHEI score for IDEM sample sites in 1997 was 70 and 68 in 2002 (S.L. Sobat, public presentation, 2006). The average QHEI score for the 2005 survey (12 sites) was 74.1. Habitat quality could have a negative effect on the biological communities present where QHEI scores are less than 51 (S.L. Sobat, public presentation, 2006). Habitat scores greater than 60 generally indicate that few stream alterations have been made, while scores above 70 reflect very good habitat. All three surveys indicated that the quality of

available habitat based on the QHEI was well above the statewide average of 59.0 (S.L. Sobat, public presentation, 2006).

The abundance of species intolerant to poor water quality such as northern hogsucker and various species of redhorse is evidence that the water quality of the West Fork and Whitewater River is good. Conservation and enhancement of the riparian corridor adjacent to the river will reduce the amount of nutrients and sediments entering the river, which ultimately affects water quality and the biological integrity of the system. Over time, as riparian areas develop, trees will provide additional instream cover in the form of woody debris for fish such as smallmouth and rock bass.

The West Fork Whitewater River and the Whitewater River provide the outdoor enthusiast the opportunity to enjoy one of Indiana's most scenic river systems. The steep gradients and swift flows of the West Fork and mainstem Whitewater River have helped it become one of the most utilized streams in Indiana for canoeing. However, access to the river is limited to canoe liveries, private property, and bridge crossings. The DFW should consider purchasing and developing public access if suitable property becomes available.

RECOMMENDATIONS

- Pursue public access on the West Fork Whitewater River and Whitewater River.

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Table 1. Length frequency and age of smallmouth bass collected from the West Fork Whitewater River and Whitewater River, 2005.

TL	River Mile												Total	Age
	8.5	17.4	29.2	39.2	46.7	52.7	56.0	60.5	65.6	69.4	74.2	78.2		
1.5												1	1	YOY
2.0														
2.5				1			1	3					5	YOY
3.0		1											1	YOY
3.5			2	1									3	YOY
4.0	1			2				3					6	YOY
4.5	1		4	4						1			10	YOY, 1
5.0	1		2	1		1							5	YOY, 1
5.5		3	1		1								5	1
6.0	4	3	2	1	2	1		1					14	1, 2
6.5	4	3	2			1	1	1					12	1, 2
7.0	5	1	2										8	1, 2
7.5	3			1									4	1, 2
8.0	1												1	1
8.5	2		1					2					5	1, 2, 3
9.0	1												1	2
9.5		1	1		1		1	1					5	2, 3
10.0		1	1		1			1				1	5	3
10.5	2	2				1		1			1	1	8	3, 4
11.0		1	2				1	1	1				6	3, 4
11.5	4		3	1			2				1	1	12	3, 4
12.0	1	1											2	3, 4
12.5	1				1								2	3, 4
13.0					1								1	not aged
13.5					1					1			2	not aged
14.0				1									1	4
14.5								1					1	6
15.0			1										1	5
15.5			1										1	not aged
16.0	1												1	not aged
16.5														
17.0														
17.5				1									1	not aged
18.0														
18.5														
19.0														
19.5														
20.0														
20.5	1												1	not aged
Total	33	17	25	14	8	4	6	15	1	2	2	4	131	

Table 2. Length frequency and age of rock bass collected from the West Fork Whitewater River and Whitewater River, 2005.

TL	River Mile												Total	Age
	8.5	17.4	29.2	39.2	46.7	52.7	56.0	60.5	65.6	69.4	74.2	78.2		
1.5														
2.0					1					1			2	1
2.5														
3.0														
3.5								1			1		2	2
4.0	1	1											2	2
4.5	1								1				2	3
5.0							1	1				1	3	2, 3, 4
5.5						2	3	2		1	2		10	3, 4
6.0				1		1	3	3					8	3, 4
6.5						1	1	1	1	1			5	3, 4, 5
7.0							3			1			4	4, 5, 6
7.5			2			1							3	not aged
8.0					2					2			4	not aged
8.5							1					1	2	not aged
Total	2	1	2	1	3	5	12	8	2	6	3	2	47	

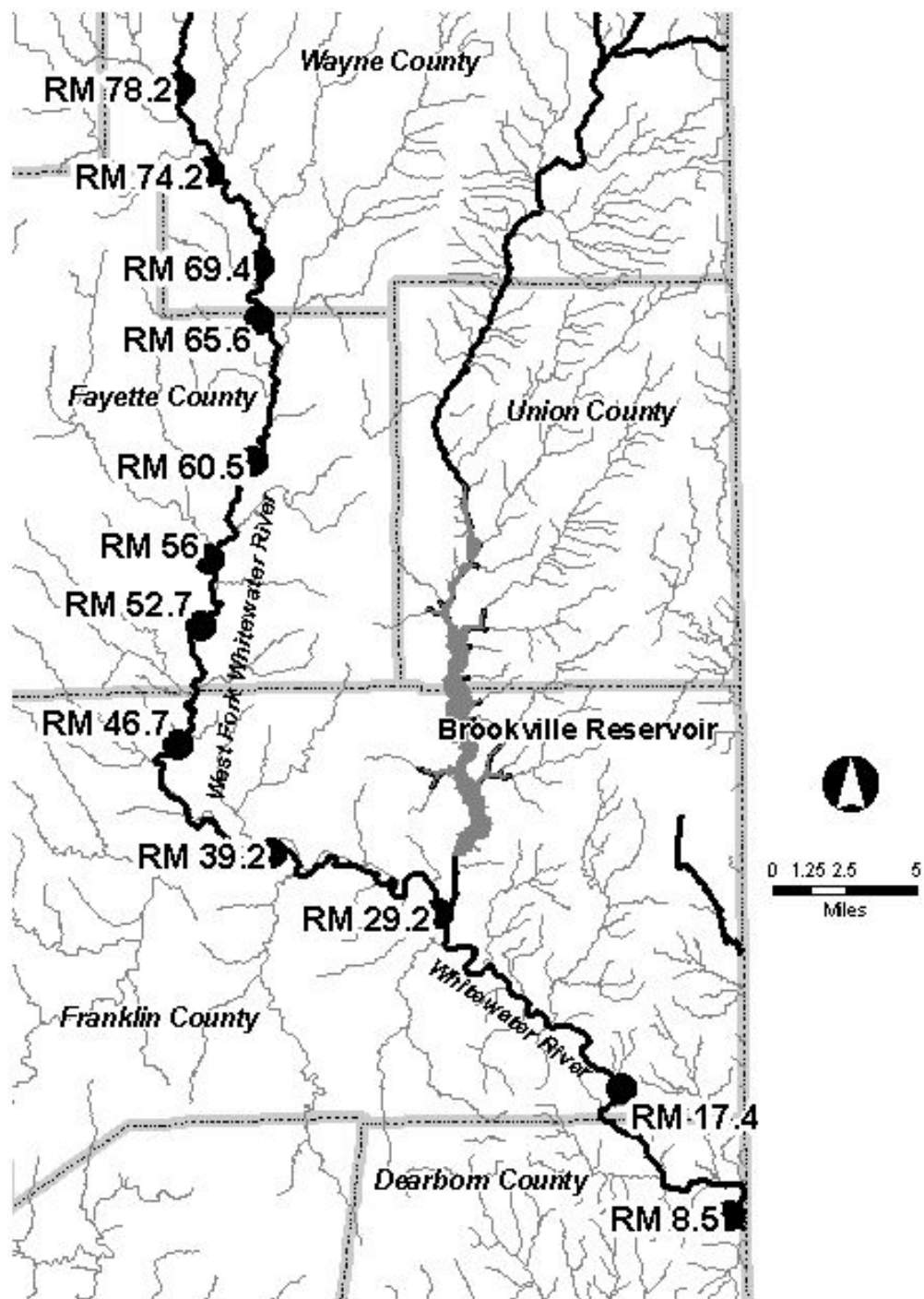


Figure 1. Sample sites on the West Fork Whitewater River and Whitewater River, 2005.

APPENDIX A

NAME, NUMBER, SIZE, AND WEIGHT OF FISH COLLECTED IN THE WEST FORK
WHITEWATER RIVER AND WHITEWATER RIVER, 2005

APPENDIX B

SPECIES, NUMBER, AND WEIGHT OF FISH COLLECTED BY FAMILY IN THE
WEST FORK WHITEWATER RIVER AND WHITEWATER RIVER, 2005

APPENDIX C

DETAILED STATION DESCRIPTIONS, FISH COLLECTIONS,
AND HABITAT EVALUATIONS FOR EACH STATION ON THE
WEST FORK WHITEWATER RIVER AND WHITEWATER RIVER, 2005

APPENDIX D

BACK CALCULATED LENGTH AT AGE
FOR SMALLMOUTH BASS AND ROCK BASS COLLECTED ON THE
WEST FORK WHITEWATER RIVER AND WHITEWATER RIVER, 2005